

# HW Solutions Section 2.2

No. 2.2

Date 1

| Problem | Ans   | Reason   |
|---------|---|--|
| 1       | (a) $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 5040$<br>(b) 56<br>(c) $9 \times 8 \times 7 = 504$<br>(d) $\frac{52 \times 51 \times 50 \times 49 \times 48}{5 \times 4 \times 3 \times 2 \times 1}$ | $\frac{87 \times 84 \times 81}{3 \times 2 \times 1}$                     |
| 2       | (a) $4! = 24$<br>(b) $720 - 2 = 718$<br>(c) $8! = 40320$<br>(d) $120 + 6 = 126$   |  |
| 3       | $6 \times 5 \times 4 \times 3 = 360$<br>(Book wrong)  |  |
| 4       | $7 \times 6 = 42$   |  |
| 5       | $5! = 120$  |  |
| 6       | $7 \times 6 \times 5 = 210$   |  |
| 7       | $22 \times 22 = 484$  |  |
| 8       | $6 \times 5 \times 4 \times 3 = 360$  |  |
| 9       | $5 \times 4 \times 3 = 60$<br>24  | $2 \times 4$ $4 \times 7$<br># = $4 \times 3 = 12$ # = $4 \times 3 = 12$ |
| 10      | $9 \times 8 \times 7 = 504$   |  |
| 11      | $8 \times 7 = 56$   | consider<br>1 2 3 4 5 6 7 8      Each letter<br>used at most once        |

| Pr.blem | Ans  | Reason  |
|---------|--|---|
| 12      | $7 \times 6 \times 5 \times 4 = 840$<br>$480$  | formula<br>$1234567$  |
|         |  | $\# \text{ words that don't contain m is}$<br>$6 \times 5 \times 4 \times 3 = 360$<br>$840 - 360 = 480$ |
| 13      | $6 \times 5 \times 4 \times 3 \times 2 = 720$<br>$6 \times 5 \times 4 \times 3 \times 2 - 5 \times 4 \times 3 \times 2 \times 1 = 600$ |   |
| 14      | $100 \times 99 \times 98 \times \dots \times 76$<br>$= \frac{100!}{75!} = P(100, 25)$  |   |
| 15      | $9 \times 8 \times 7 = 504$  |   |
| 16      | $504 - 5 \times 4 \times 3 - 4 \times 3 \times 2 = 420$  |   |
| 17      | $11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 = \frac{11!}{4!} = P(11, 7)$  |   |
| 18      | $7200$   | $6 \times 5 \times 4 \times 3 = 360$<br>$5 \times 4 = 20$<br>$360 \times 20 = 7200$                     |
| 19      | (a) 360<br>(b) 60  | $6 \times 5 \times 4 \times 3 = 360$<br>$5 \times 4 \times 3 = 60$                                      |
| 20      | $6 \times 5 \times 4 - 5 \times 4 = 5 \times 5 \times 4 = 100$   |   |

| Pr.blem | Ans   | Reason   |
|---------|---|--|
| 21      | $5 \times 4 \times 3 = 60$  |  |
| 22      | (a) 36<br>(b) 12<br>(c) 18  | $5 \times 4 \times 3 - 4 \times 3 \times 2 = 36$<br>C__ $4 \times 3 = 12$                                  |
| 23      | (a) $10 \times 9 \times 8 = 720 = P(10, 3)$<br>(b) $720 - 9 \times 8 \times 7 = 720 - 504 = 216$<br>(c) $9 \times 8 = 72$ |  |
| 24      | $12 \times 11 \times 10 \times 9 = P(12, 4) = 11880$  |  |
| 25      | $6 \times 5 \times 4 \times 3 - 4 \times 3 \times 2 \times 1 = 336$   |  |
| 26      | (a) $4 \times 3 \times 3 = 36$<br>(b) $36 - 3 \times 2 \times 3 = 36 - 18 = 18$   |  |
| 27      | (a) $7 \times 6 \times 5 \times 4 = 840$<br>(b) $840 - 0 - 4! = 816$  |  |
| 28      | $10 \times 9 \times 8 - 8 \times 7 \times 6 - 2 \times 1 \times 0 = 384$  |  |
| 29      | $120 \times 27 = 3240$  | # choices for slots: $5 \times 4 \times 3 \times 2 = 120$<br># choices for Com: $3 \times 3 \times 3 = 27$ |
| 30      | $4! - 1 = 23$   |  |
| 31      | $\frac{5!}{2!2!} = 30$  |  |

| Problem | Ans  | Reason |
|---------|--|--------|
| 32      | $\frac{6!}{2!2!} = 180$                        |        |
| 33      | $\frac{6!}{3!} = 6 \times 5 \times 4 = 120$    |        |
| 34      | $\frac{7!}{2!3!} = 420$                        |        |
| 35      | $7 \times 6 \times 5 \times 4 \times 3 = 2520$ |        |
| 36      | 5, 6, 7, 8, 9                                  |        |